

US-PAT-NO: 6590889

DOCUMENT-IDENTIFIER: US 6590889 B1

TITLE: Data communications system and hybrid time-code multiplexing method

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Brief Summary Text - BSTX (3):

Current systems use a variety of schemes for encoding and multiplexing digital data streams for communications between terminals including frequency division multiple access (FDMA), time division multiple access (TDMA), and code division multiple access (CDMA). Some systems have also been devised which use various combinations of FDMA, TDMA, and CDMA.

Brief Summary Text - BSTX (7):

Conventional satellite, or any other form of radio relay, systems using CDMA typically cannot handle reception of signals at varying power levels from different terminals, a problem normally referred as the "near-far problem."

Detailed Description Text - DETX (15):

The container assembler 414 (FIG. 4) then packages the QAM cells into the payload of a container 416. Payloads are preferably 672 symbols long, and exactly "m" QAM-cells are concatenated, scrambled, and loaded into the payload. A header is then assembled for the payload, preferably containing, along with other information, information on the modulation level used for encoding the payload. Unlike the payload, the header is preferably modulated using 45 degree offset Binary Phase Shift Key (BPSK).

Detailed Description Text - DETX (21):

As previously indicated, a container 300 (FIG. 3) preferably includes both a header 302 and a payload 304, where the header 302 comprises 96 header symbols modulated with 45 degree offset BPSK and the payload comprises 672 info-symbols modulated with 2.sup.m -ary QAM. Collectively, the header-symbols and info-symbols may be referred to as data-symbols. The modulation level is

Q AM
parallel
BPSK →
serial.

preferably the same for all info-symbols of all **payloads** of an information packet, but may be different for **payloads** of different information packets.

Detailed Description Text - DETX (25):

As previously indicated, the **payload is preferably modulated** using $2.^{\text{sup}}.m$ -ary QAM constellations that are obtained from $N.^{\text{sup}}.2$ -ary QAM constellations. When m is odd, these $2.^{\text{sup}}.m$ -ary QAM constellations are obtained by puncturing an $N.^{\text{sup}}.2$ -ary QAM constellation. The same level of **modulation** (m) is preferably used for **modulating** all symbols in the **payload**. It is possible, however, to **modulate the payloads** of different containers with different levels of **modulation**. The **header, however, is preferably modulated** using 45 degree offset BPSK.

Detailed Description Text - DETX (27):

The payload of each container carries " m " QAM cells, with the exception of the payload of the last container that may carry fewer than m QAM cells. The actual number of QAM cells contained in the last container depends on the length of the packet and on the selected modulation level. The **modulation** level is preferably kept constant for all **payloads** originating from a single information packet. The modulation level may vary from packet to packet and is preferably selected as a function of a target bit error rate (BER), or Quality of Service (QOS), for the packet and an available (SNR). As such, it is possible to independently select the modulation level m to be used with a particular packet or channel. In addition to selecting the modulation level m based on the BER or QOS for the information and the available SNR, a power level for transmitting the packet may also be determined based on this information.

Claims Text - CLTX (25):

25. The method of claim 1, further comprising steps of generating a plurality of header bits; generating a plurality of payload bits; **modulating the header bits with a first modulation**; and **modulating the payload bits with a second modulation**; wherein the step of transmitting the information includes the substeps of transmitting the **modulated the header** bits, and transmitting the **modulated payload** bits.

Claims Text - CLTX (53):

53. The node of claim 29, further comprising means for generating a plurality of header bits; means for generating a plurality of payload bits;

means for modulating the header bits with a first modulation; and means for modulating the payload bits with a second modulation; wherein the means for transmitting the information includes means for transmitting the modulated header bits, and means for transmitting the modulated payload bits.